From: Tuncer Edil <edil@engr.wisc.edu>
To: Priscilla Burton <PRISCILLABURTON@utah.gov>
Date: 4/26/03 1:58PM
Subject: RE: soil engineering question

Priscilla:

Here are my responses.

From your description I see no peak to speak of post-peak. You describe a near-linearly rising curve and use of end-point stresses in calculating strength. Is this being performed in a direct shear device? What is the maximum size of the gravel grains and the size of direct shear box? I find 54 degrees very high and suspect. Combined with that unusually high cohesion, this material becomes one of the strongest anywhere. The argument about post-peak being conservative etc is correct and fine but I am not sure that is what you have here. There may be a test artifact. If I see the report I can be a bit more specific. Good luck in your new understanding of soils engineering!

Tuncer B. Edil
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-----Original Message-----
From: Priscilla Burton [mailto:PRISCILLABURTON@utah.gov]
Sent: Thursday, April 24, 2003 5:46 PM
To: edil@engr.wisc.edu
Subject: soil engineering question

Hello Tuncer,

I attended the Soil Engineering for Non-Soils Engineers in October of 2002. At that time we discussed values for peak friction angles and cohesion. I am writing to ask for your opinion of the following information.

I am reviewing a stability analysis where the backfill material is described as GM, a silty gravel with sand; post peak friction angle = 54 degrees.

The consultant indicates that using post-peak friction angle is appropriate, since the material continues to gain strength after shearing has begun. The diplacement vs shear strength curve continues to rise and is nearly linear. The consultant explains that this is due to the larger particles in the material rotating and increasing shearing

resistance.

Since this material did not show any clear shearing point, the shear stress vs normal stress plot is of the maximum stresses applied and results in a cohesion of 1,877 psf which seems like a large number for a material that is also reported to be coarse and non-plastic.

The consultant indicates that post-peak shear strengths are typically used in slope evaluation because the conservative assumption is made that the material has already undergone peak shearing.

The reported Phi of 54 degrees seems very rare.

Questions : Would you agree with this assessment of the typical use of post-peak shear strengths for coarse material?
Is it possible that a coarse, non-plastic material could have such high cohesion?
How many soil samples/volume of material are ordinarily run on a material to assure that the material is uniform?

If you would like to see the laboratory reports for this material, I will fax them to you.

Sincerely,
Priscilla. Burton

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